A. CIP Attribute Definitions

This appendix forms an integral part of the CIP specification.

This appendix defines the Z39.50 attributes used by the CIP and contains the following sub-sections:

- Appendix A.1 describes the *Use attributes* used by the CIP.
- Appendix A.2 describes the *Relation attributes* used by the CIP.
- Appendix A.3 describes the *Position attributes* used by the CIP.
- Appendix A.4 describes the *Structure attributes* used by the CIP.
- Appendix A.5 describes the *Truncation attributes* used by the CIP.
- Appendix A.6 describes the *Completeness attributes* used by the CIP.
- Appendix A.7 defines the permissible *attribute combinations* that are used by the CIP.

The *Use attributes* for the CIP are fully customised and are defined in the CIP *Attribute set* identified by the {Z39.50-CIP-AttributeSet} OID. For the other types of *attributes* (*Relation, Position, Structure, Truncation* and *Completeness*), the existing bib-1 *attributes*, defined in the bib-1 *Attribute set* identified by the {Z39.50-AttributeSet-bib-1} OID, are used whenever possible. Where necessary, custom CIP *attributes* are also defined for those types. In this way, the set of *attributes* supported by the CIP is defined by a custom CIP *Attribute set*[1] together with a subset of the bib-1 *Attribute set*.

In Appendices A, B and C the CIP *attributes*, *tag set elements* and *schema elements* are defined using the CCSDS Data Entity Dictionary Specification Language (DEDSL)[DEDSL]. The purpose of this standard is to formalise the semantic definition of data entities. In the case of the CIP, this is provided by the *attributes* and *elements*. Z39.50 provides a facility for conveying *attribute* and *element* definition data; that is the *Explain facility* (see Section 4.5.4). The *Explain facility* uses a *database* called the *Explain database* to store the definitions of the *attributes* and *elements* for retrieval and delivery to the client.

For each *attribute* and *element*, there are a number of fields within the *Explain database* to store the description information, such as '**`Name`**' and '**`Description`**'. However, the standard *Explain database*, as defined by Z39.50-1995[Z3950] does not currently support an equivalent field for each of the fields defined in the DEDSL standard[DEDSL].

The complete listing of *attribute* and *element* definitions is called the CIP Data Entity Dictionary.

Table A-1 shows the information that is to be maintained in the Data Entity Dictionary, indicating if the information is either a DEDSL standard attribute or CIP user defined attribute, whether it is to be conveyed in the *Explain facility* objects, whether it is conveyed by the Z39.50 standards (Std) or the by the CIP extension of the Z39.50 standard (Ext) and any additional associated comments.

[1] The CIP *Attribute set* is a self-contained *attribute set*. However, all the CIP *attributes* which are common with the *attributes* defined in the GEO profile[GEO] have been aligned with their corresponding GEO *attributes* (i.e. they share the same *attribute value*).

Table A-1: CIP Semantic Attribute Definitions

Semantic Attribute	Description	DEDSL	Explain Database		Comments
		Source	Std	Ext	
Name	Name of the attribute/element. Note that the name is not used to identify the attribute (this is done by its value, '#'), but can be considered as a mnemonic synonym for the value.	Standard	O	X	
Short Meaning	Short description of the attribute/element, particularly useful for display purposes.	Standard	X	O	Optional
Meaning	Definition of the meaning of the attribute/element.	Standard	O	X	
Units	Unit associated with the attribute/element.	Standard	X	O	Supplied only when applicable
Alias	Can be used to provide the user with alternate names (plus relevant context) to assist in deciding on the attributes to search upon.	Standard	O	X	Optional and repeatable
Specific Instance	Used to enhance user interface by providing textual meanings for specific values, i.e. 0 = 'Equator'.	Standard	X	O	Optional and repeatable
Comment	Used to convey any other additional information about the attribute/element.	Standard	X	O	Optional
Id	Identifier of the attribute. The attribute identifier is composed of the Attribute Set identifier ('AS'), which is either 'bib-1' or 'CIP', and the value of the attribute within the Attribute Set ('#'). The **Id** is the identifier which, within a profile, uniquely identifies the attribute and is used to reference it in queries (it is the Z39.50 understood 'name' rather than the **Name** field, which is for human use).	User defined	N/A	N/A	This is defined in the data dictionary and implicitly conveyed in the Z39.50 search objects
Ver	The version of the definition of the attribute/element (used for configuration control purposes).	User defined	X	O	
Value Syntax	Definition of the abstract data type, internal structure and/or range of the instance of the attribute/element.	Standard	X	O	In the following tables this has been simplified, but will include permitted values, ranges, etc. All the elements that have a 'ENUM" in the Value Syntax column are defined from a controlled list of terms (valids). When these valids are defined in [VALID], "O" is used in the Valid Source column. Otherwise (i.e. the valids are defined elsewhere), "X" is used.
Str	Definition of the Z39.50 ASN.1 data type. This corresponds to the identifier of the Structure Attribute (see Appendix A.4), and indicates the recommended structure for the term to be matched and the element matched.	User defined	N/A	N/A	This is defined in the data dictionary and implicitly conveyed in the Z39.50 search objects

A.1 Use Attributes

Use attributes are used as *access points* for a search and so can be considered as search keys. In a search (see Section 3.5.2.1), *Use attributes* identify WHAT the *term* is to be matched with.

In the CIP, the set of *Use attributes* is closely related to the set of *schema elements*. This is made explicit by the fact that every *use attribute* which corresponds to a schema element uses the same identifier as its corresponding schema element (see also Section 3.5.3.2.2). Moreover, each mandatory *Use attributes* corresponds to a mandatory schema element.

For convenience to the reader, the CIP *Use attributes* defined in the CIP *Attribute set* have been grouped according to the type of descriptor to which they apply (i.e. collection, product or user descriptor). Furthermore, for each type of descriptor, the CIP *Use attributes* have been grouped according to whether the *Use attributes* is mandatory or optional[2]. Finally, for both mandatory and optional *attributes*, the CIP *Use attributes* have been grouped about the type of the *Use attribute* (i.e. leaf or compound *Use attribute*). The various groupings of CIP *Use attributes* are provided in tables in the sub-sections below.

In each table including a list of *Use attributes* supported by the CIP, the identifier of the *Use attributes* ('#') represents the *attribute value* for the *Use attribute type* within the CIP *Attribute set*. In this manner, the OIDs of the CIP *Use attribute values* are defined as **`{Z39-50-CIP-Attribute-Set 1 #}`**. The '**Str**' column refers to a structure identifier in the CIP *Structure attribute* table (see Table A-14) and indicates the recommended data type for the *attribute*.

[2] Optional *Use attribute* are not required to be supported as search keys by the CIP. However, they need to be recognised as valid CIP *Use attributes*.

A.1.1 Collection Use Attributes

A.1.1.1 Mandatory Collection Use Attributes

A.1.1.1.1 Mandatory Collection Leaf Use Attributes

Table A-2: CIP Mandatory Collection Leaf Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
1016	1.2	Any	Any	NULL	N/A	N/A	'Any' is a wildcard attribute that is used to represent any other attribute from the attribute set. When evaluating an operand containing the 'any' attribute, the Retrieval Manager substitutes 'any' in with each attribute that it considers appropriate. For example, if a query is performed with an operand specified with ' use is any, structure is date, relation is > and term is 60', then the Retrieval Manager will substitute any with all the attributes whose structure is date (i.e. CreationDate, RevisionDate, etc.).
4004	1.2	ArchivingCentreId	Archiving Centre Identifier	ENUM	O	bib-1 101	Unique code for the agency/data centre holding the data. Several copies of a single product can exist and each archive will be listed as a possible source of that product.
4018	1.3	CollectionCategory	Collection Category	ENUM	O	bib-1 101	Category of a collection.
4020	1.3	CollectionHierarchyCategory	Collection Hierarchy Category	ENUM	O	bib-1 101	Category of the hierarchy.
4021	1.3	CollectionHierarchyPosition	Collection Hierarchy Position	ENUM	O	bib-1 101	Position of the collection in the collection hierarchy, i.e. 'terminal' or 'non-terminal'.
2039	1.2	EastBoundingCoordinate	East Bounding Coordinate	REAL	X	CIP 200	Easternmost longitude covered.
2073	1.2	EndDate	End Date	TIME	X	bib-1 100	Latest date of the temporal coverage.
3805	2.3	GeospatialForm	Geospatial Form	ENUM	O	bib-1 101	A characterisation of the type of product, e.g. satellite image or map.
12	1.2	ItemDescriptorId	Item Descriptor Identifier	STRING	X	bib-1 101	Unique identifier used by the data system or data producer to distinguish a collection or product from all others owned by a single Retrieval Manager. This identifier is also used to refer to the members of a collection, which might be collection or product descriptors.
4042	2.3	ItemDescriptorLanguage	Item Descriptor Language	ENUM	O	bib-1 101	The language in which the item descriptor is defined.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4	1.2	ItemDescriptorName	Item Descriptor Name	STRING	X	bib-1 101	Short name of an item descriptor. This element is meant as a human-readable form of the ItemDescriptorId.
2040	1.2	NorthBoundingCoordinate	North Bounding Coordinate	REAL	X	CIP 200	Northernmost longitude point covered.
4106	1.2	RevisionDate	Revision Date	TIME	X	bib-1 100	Date and possibly time at which the data was created or the latest date and time of its modification or update.
2041	1.2	SouthBoundingCoordinate	South Bounding Coordinate	REAL	X	CIP 200	Southernmost latitude point covered.
2072	1.2	StartDate	Start Date	TIME	X	bib-1 100	Start date of the temporal coverage.
2002	2.3	ThemeKeyword	Theme Keyword	ENUM	O	bib-1 6	Controlled keyword list to define the theme (e.g. discipline, topic) covered by a collection.
2038	1.2	WestBoundingCoordinate	West Bounding Coordinate	REAL	X	CIP 200	Westernmost longitude covered.

A.1.1.1.2 Mandatory Collection Compound Use Attributes

Table A-3: CIP Mandatory Collection Compound Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
2060	1.2	BoundingRectangle	Bounding Rectangle	compound	X	bib-1 202	The limits of coverage of a item descriptor expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For item descriptors that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding Coordinate shall be assigned the value 180.0.
4019	1.2	CollectionDescriptor	Collection Descriptor	compound	X	CIP 204	Information about a collection.
4022	1.2	CollectionType	Collection Type	compound	X	CIP 204	Type of a collection.
4026	1.2	DataOriginator	Data Originator	compound	X	CIP 204	Information about the originator of the data.
4036	2.1	IncludedCollectionDescriptors	Included Collection Descriptors	compound	X	CIP 204	Collection descriptors (registered or unregistered) that are included as members of a collection.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4037	2.1	IncludedItemDescriptors	Included Item Descriptors	compound	X	CIP 204	Item Descriptors (either collection descriptors or product descriptors only) that are included as members of a collection..
4038	2.1	IncludedProductDescriptors	Included Product Descriptors	compound	X	CIP 204	Product descriptors that are included as members of a collection.
4039	2.1	InstrumentSensor	Sensor/Instrument	compound	X	CIP 204	Information related to the sensor/instrument such as name and sensor modes. The sensor/instrument is the hardware used to acquire the data.
3121	1.2	Keywords	Keywords	compound	X	CIP 204	Keywords related to the collection.
4071	2.3	Platform	Platform	compound	X	CIP 204	Support which carries the instrument(s)/sensor(s). A platform can be a spacecraft, a ground station or an aircraft.
4078	2.1	ProductCollectionSpecific	Product Collection Specific	compound	X	CIP 204	Collection descriptor information specific to a collection of product descriptors (i.e. a collection for which ColectionHierarchyCategory is ‘product’). This includes all the information which is specific to the Earth Observation domain.
4105	1.3	Revision	Revision	compound	X	CIP 204	Revision information. Revision is different than review in that it refers to the information related to the changes of the collection, whereas review refers to the information related to the reviewing of the metadata (i.e. the revision and the review do not necessarily coincide).
2059	1.2	SpatialCoverage	Spatial Coverage	compound	X	CIP 204	The spatial coverage element indicates (usually in very coarse resolution) the spatial coverage of the data described.
2062	1.2	TemporalCoverage	Temporal Coverage	compound	X	CIP 210	Time coverage for the data content.
3122	2.3	ThemeKeywords	Theme Keywords	compound	X	CIP 204	Information on theme keywords.

A.1.1.2 Optional Collection Use Attributes

A.1.1.3 Optional Collection Leaf Use Attributes

Table A-4: CIP Optional Collection Leaf Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
62	2.1	Abstract	Abstract	STRING	X	bib-1 108	A brief narrative summary of the content of an item.
4003	2.1	AlgorithmPackageName	Algorithm Package Name	STRING	X	bib-1 101	Name given to the complete delivered package.
4005	2.3	AttributeSetId	Attribute Set Identifier	STRING	X	bib-1 101	Identification of an attribute set in which local attributes are defined.
4006	1.2	Authoritative	Authoritative	STRING	X	bib-1 101	Item descriptor identifier of the authoritative collection or product.
4023	1.2	CreationDate	Creation Date	TIME	X	bib-1 100	Date at which the data was created.
4025	1.2	DataCentreName	Data Centre Name	ENUM	O	bib-1 101	The data centre name is composed of both short and long versions in the same manner as short and long sensor and data source names.
4029	2.3	ElevationMaximum	Elevation Maximum	REAL	X	bib-1 205	Highest elevation contained in the data (in meters).
4030	2.3	ElevationMinimum	Elevation Minimum	REAL	X	bib-1 205	Lowest elevation contained in the data (in meters).
4033	2.1	Frame	Frame	INTEGER	X	bib-1 206	Frame number.
3703	1.2	FutureReviewDate	Future Review Date	TIME	X	bib-1 100	This date, suggested by the author, indicates a time at which the collection should be reviewed for technical content.
2058	1.2	GeneralKeyword	General Keyword	STRING	X	bib-1 6	This element provides the capability of entering general keywords that are not found in the theme, temporal or spatial keywords. It could be used, for example, to specify fine resolution location words or more specific discipline-dependent words or phenomena. For example, 'Lightening'. In comparison to the other keywords, the general keywords are uncontrolled.
4035	2.1	GroupId	Group Identifier	ENUM	O	bib-1 101	Identification of the user groups having access to specific options, e.g. for product order options may differ for each user group.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4043	2.3	ItemDescriptorLongName	Item Descriptor LongName	STRING	X	bib-1 101	Long name of an item descriptor. This is the reference name used in describing the scientific contents of the data collection, not the identifier of the data collection.
3118	2.1	Latitude	Latitude	REAL	X	CIP 200	The latitude of a point.
4046	2.3	LocalAttributeId	Local Attribute Identifier	INTEGER	X	bib-1 101	Uniquely identifies a local attribute within the local attribute set in which the local attribute is defined.
4057	2.3	LocalUseAttributesFlag	Local Use Attributes Flag	ENUM	O	bib-1 101	Flag indicating whether: • a collection has no local attributes (value = 0) • a collection has local attributes defined within the collection descriptor (value = 1) • a collection has local attributes defined in the Explain database (value = 2)
3119	2.1	Longitude	Longitude	REAL	X	CIP 200	The longitude of a point.
4059	1.2	MissionId	Mission and Satellite Identification	ENUM	O	bib-1 101	Unique code for the satellite/mission.
4060	2.2	OrderingCentreId	Ordering Centre Identifier	STRING	X	bib-1 101	Unique code for the local ordering handler from which the data can be ordered.
2024	2.1	OrganisationName	Organisation Name	STRING	X	bib-1 101	The name of the organisation to which the contact apply.
4066	1.2	Originator	Originator	STRING	X	bib-1 102	The name of an organisation or individual that developed the data.
4069	2.4	PeriodDefinition	Period Definition	TIME	X	CIP 210	The definition of a recurring time interval.
2023	1.2	PersonName	Person Name	STRING	X	bib-1 101	Name of a person. The last name should be given first, followed by the first name and, if applicable, the middle name.
4074	1.2	ProcessingCentre	Processing Centre	ENUM	O	bib-1 101	Contains the short name of the data centre that has generated the data.
4077	1.2	ProcessingLevelId	Processing Level Identifier in the Archive	ENUM	O	bib-1 101	This parameter identifies the processing level of the data in the archive.
3632	2.1	ProductMedium	Product Medium	ENUM	O	bib-1 101	Medium on which the product is available, e.g. ‘CD-ROM’, ‘Exabyte’.
3108	1.2	Progress	Progress	STRING	X	bib-1 6	The state of the collection (i.e. ‘completed’, ‘in work’, ‘planned’).

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4086	1.2	ProjectName	Campaign or Project Name	ENUM	O	bib-1 101	This element should be supplied when there is a relationship of the collection to a campaign or project (e.g. WOCE, FIRE, PROMIS, etc.). Campaigns or projects usually encompass data from a number of diverse data sources. The element includes both short and long names.
2003	2.3	Purpose	Purpose	STRING	X	bib-1 108	Summary of the intentions for which the data was developed.
4094	2.1	RadiusValue	Radius Value	REAL	X	bib 1 205	The radius of a circle expressed in km.
4107	2.3	Role	Role	ENUM	O	bib-1 101	The role of a person for the collection..
4108	2.3	Scale	Scale	ENUM	O	bib-1 101	The scaling used for the data (e.g. map).
3702	1.2	ScienceReviewDate	Science Review Date	TIME	X	bib-1 100	Date and time of the latest review of the collection for accuracy of scientific or technical content.
4112	1.2	ScienceReviewStatus	Science Review Status	ENUM	O	bib-1 2	Type of review which occurred on the Science Review Date.
4113	2.3	SensorId	Sensor/Instrument Identifier	ENUM	O	bib-1 101	A mnemonic or otherwise abbreviated version (acronym) for the sensor/instrument. In case that several sensors are carried on board of an instrument a separate SensorId is provided that is constructed by "<InstrumentId>-[<SensorId>}". Note that <InstrumentId> can appear without <SensorId> following it, but that <SensorId> must be preceded by <InstrumentId>. Moreover, a hyphen must be used as separator between <InstrumentId> and <SensorId>. If a search is desired on a sensor type, e.g., radiometer, a wild card search can be performed
2042	1.2	SpatialKeyword	Spatial Keywords	ENUM	O	bib-1 6	The spatial keywords provide the capability of selecting place names to be used as search parameters, usually as an alternative to specifying latitudes and longitudes (which may not apply in some disciplines). For example, ‘Tropical Region’, ‘Atlantic Ocean’.
4115	2.3	SpatialResolution	Spatial Resolution	ENUM	O	bib-1 101	The minimum distance between two adjacent geographic points.
2045	1.2	TemporalKeyword	Temporal Keyword	ENUM	O	bib-1 6	The name of a time period covered by a collection. For example, ‘Summer’.
4119	2.3	TemporalResolution	Temporal Resolution	STRING	X	bib-1 108	The temporal frequency of data sampled.
4121	2.1	Track	Track	INTEGER	X	bib-1 206	Track number.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
3109	2.3	UpdateFrequency	Maintenance and Update Frequency	ENUM	O	bib-16	The frequency with which changes and additions are made to the data set after the initial data set is completed.
4127	2.3	VersionId	Version Identifier	STRING	X	bib-1101	Version identifier.

A.1.1.3.1 Optional Collection Compound Use Attributes

Table A-5: CIP Optional Collection Compound Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4017	2.1	Circle	Circle	compound	X	CIP 10	Circle on the surface of the Earth.
3000	1.2	Contact	Contact Information	compound	X	CIP 204	Contact details.
4024	1.3	DataCentre	DataCentre	compound	X	CIP 204	Information regarding the data centre which distributes the data.
4027	2.1	DeliveredAlgorithmPackage	Delivered Algorithm Package	compound	X	CIP 204	A software package associated to a specific product collection, e.g. to be used to manipulate the data products of this particular collection.
3116	2.1	GPolygon	G Polygon	compound	X	bib-1202	Coordinates defining the outline of the area covered by the data.
3117	2.1	GPolygonOuterGRing	G Polygon Outer G Ring	compound	X	bib-1202	The closed non-intersecting boundary of the interior area of the data spatial coverage.
4045	2.3	LocalAttribute	Local Attribute	compound	X	CIP 204	The complete definition for a local attribute.
4055	2.3	LocalProductUseAttributes	Local Product Use Attributes	compound	X	CIP 204	Contains the list of all the Use attributes defined for a collection and which can be used in order to search the products included in the collection.
4061	2.4	OrderOptionsGroup	Order Options Group	compound	X	CIP 204	Identifies a single order option group, i.e. a set of order options (processing, scene selection, delivery) which can be freely combined between themselves.
4072	2.1	Point	Point	compound	X	bib-1201	Coordinates of a point on the surface of the Earth.
4073	2.1	Processing	Processing	compound	X	CIP 204	Information related to the processing of the data, such as the processing centre and the processing level.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4075	1.3	ProcessingLevel	Processing Level	compound	X	CIP 204	Processing level information.
4079	2.1	ProductDeliveryOption	Product Delivery Option	compound	X	CIP 204	Information about a delivery option available for a data product, such as formats, media.
4081	2.1	ProductOrderOptions	Product Order Options	compound	X	CIP 204	Information about the different processing and/or order options available for product order.
4084	2.1	ProductServiceOptions	Product Service Options	compound	X	CIP 204	The different service options available for a data product, such a different order options.
4104	1.2	Review	Review	compound	X	CIP 204	Review information.
4111	1.3	ScienceReview	Science Review	compound	X	CIP 204	Science review information.
2061	2.3	SpatialKeywords	Spatial Keywords	compound	X	CIP 204	Information on spatial keywords.
3131	2.3	TemporalKeywords	Temporal Keywords	compound	X	CIP 204	Information on temporal keywords.
4118	2.2	TemporalPeriod	Temporal Period	compound	X	CIP 210	Period definition for the data content.
3906	2.2	TemporalRange	Temporal Range	compound	X	CIP 204	Date range definition for the data content.
4128	2.3	VerticalExtent	Vertical Extent	compound	X	CIP 204	Metadata for the vertical space covered by the item descriptor above and/or under the earth's surface.
4129	2.1	WRSGRSPass	WRS/GRS Pass	compound	X	CIP 9	World Reference System / Geolocation Reference System pass.
4130	2.1	WRSGRSScene	WRS/GRS Scene	compound	X	CIP 9	World Reference System / Geolocation Reference System scene.

A.1.2 Product Use Attributes

A.1.2.1 Mandatory Product Use Attributes

A.1.2.1.1 Mandatory Product Leaf Use Attributes

Table A-6: CIP Mandatory Product Leaf Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
1016	1.2	Any	Any	NULL	N/A	N/A	'Any' is a wildcard attribute that is used to represent any other attribute from the attribute set. When evaluating an operand containing the 'any' attribute, the Retrieval Manager substitutes 'any' in with each attribute that it considers appropriate. For example, if a query is performed with an operand specified with ' use is any, structure is date, relation is > and term is 60', then the Retrieval Manager will substitute any with all the attributes whose structure is date (i.e. CreationDate, RevisionDate, etc.).
2039	1.2	EastBoundingCoordinate	East Bounding Coordinate	REAL	X	CIP 200	Easternmost longitude covered.
2073	1.2	EndDate	End Date	TIME	X	bib-1 100	Latest date of the temporal coverage.
12	1.2	ItemDescriptorId	Item Descriptor Identifier	STRING	X	bib-1 101	Unique identifier used by the data system or data producer to distinguish a collection or product from all others owned by a single Retrieval Manager. This identifier is also used to refer to the members of a collection, which might be collection or product descriptors.
2040	1.2	NorthBoundingCoordinate	North Bounding Coordinate	REAL	X	CIP 200	Northernmost longitude point covered.
2041	1.2	SouthBoundingCoordinate	South Bounding Coordinate	REAL	X	CIP 200	Southernmost latitude point covered.
2072	1.2	StartDate	Start Date	TIME	X	bib-1 100	Start date of the temporal coverage.
2038	1.2	WestBoundingCoordinate	West Bounding Coordinate	REAL	X	CIP 200	Westernmost longitude covered.

A.1.2.1.2 Mandatory Product Compound Use Attributes

Table A-7: CIP Mandatory Product Compound Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
2060	1.2	BoundingRectangle	Bounding Rectangle	compound	X	bib-1 202	The limits of coverage of a item descriptor expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For item descriptors that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding Coordinate shall be assigned the value 180.0.
4080	1.2	ProductDescriptor	Product Descriptor	compound	X	CIP 204	Information about a product.
2059	1.2	SpatialCoverage	Spatial Coverage	compound	X	CIP 204	The spatial coverage element indicates (usually in very coarse resolution) the spatial coverage of the data described.
2062	1.2	TemporalCoverage	Temporal Coverage	compound	X	CIP 210	Time coverage for the data content.
3906	2.2	TemporalRange	Temporal Range	compound	X	CIP 204	Date range definition for the data content.

A.1.2.2 Optional Product Use Attributes

A.1.2.2.1 Optional Product Leaf Use Attributes

Table A-8: CIP Optional Product Leaf Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
62	2.1	Abstract	Abstract	STRING	X	bib-1 108	A brief narrative summary of the content of an item.
4004	1.2	ArchivingCentreId	Archiving Centre Identifier	ENUM	O	bib-1 101	Unique code for the agency/data centre holding the data. Several copies of a single product can exist and each archive will be listed as a possible source of that product.
4006	1.2	Authoritative	Authoritative	STRING	X	bib-1 101	Item descriptor identifier of the authoritative collection or product.
4029	2.3	ElevationMaximum	Elevation Maximum	REAL	X	bib-1 205	Highest elevation contained in the data (in meters).

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4030	2.3	ElevationMinimum	Elevation Minimum	REAL	X	bib-1 205	Lowest elevation contained in the data (in meters).
4033	2.1	Frame	Frame	INTEGER	X	bib-1 206	Frame number.
2058	1.2	GeneralKeyword	General Keyword	STRING	X	bib-1 6	This element provides the capability of entering general keywords that are not found in the theme, temporal or spatial keywords. It could be used, for example, to specify fine resolution location words or more specific discipline-dependent words or phenomena. For example, 'Lightening'. In comparison to the other keywords, the general keywords are uncontrolled.
4035	2.1	GroupId	Group Identifier	ENUM	O	bib-1 101	Identification of the user groups having access to specific options, e.g. for product order options may differ for each user group.
4042	2.3	ItemDescriptorLanguage	Item Descriptor Language	ENUM	O	bib-1 101	The language in which the item descriptor is defined.
4044	2.3	ItemLanguage	Item Language	ENUM	O	bib-1 101	The language in which any textual information within the deliverable item is defined.
3614	2.3	ItemSize	Item Size	REAL	X	bib-1 205	Size of an item in megabytes.
3118	2.1	Latitude	Latitude	REAL	X	CIP 200	The latitude of a point.
3119	2.1	Longitude	Longitude	REAL	X	CIP 200	The longitude of a point.
4059	1.2	MissionId	Mission and Satellite Identification	ENUM	O	bib-1 101	Unique code for the satellite/mission.
4060	2.2	OrderingCentreId	Ordering Centre Identifier	STRING	X	bib-1 101	Unique code for the local ordering handler from which the data can be ordered.
4066	1.2	Originator	Originator	STRING	X	bib-1 102	The name of an organisation or individual that developed the data.
4069	2.4	PeriodDefinition	Period Definition	TIME	X	CIP 210	The definition of a recurring time interval.
4074	1.2	ProcessingCentre	Processing Centre	ENUM	O	bib-1 101	Contains the short name of the data centre that has generated the data.
4077	1.2	ProcessingLevelId	Processing Level Identifier in the Archive	ENUM	O	bib-1 101	This parameter identifies the processing level of the data in the archive.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
3632	2.1	ProductMedium	Product Medium	ENUM	O	bib-1 101	Medium on which the product is available, e.g. 'CD-ROM', 'Exabyte'.
3234	2.1	QAPercentCloudCover	QA Cloud Cover Percentage	INTEGER	X	bib-1 206	Area obstructed by clouds, expressed as a percentage of the spatial coverage of the data.
4088	1.2	QAPercentInterpolatedData	QA Interpolated Data Percentage	INTEGER	X	bib-1 206	Percentage of interpolated data in a product.
4089	1.2	QAPercentMissingData	QA Missing Data Percentage	INTEGER	X	bib-1 206	Percentage of missing data in a product.
4090	1.2	QAPercentOutOfBoundsData	QA Out of Bounds Data Percentage	INTEGER	X	bib-1 206	Percentage of out of bounds data in a product.
4094	2.1	RadiusValue	Radius Value	REAL	X	bib 1 205	The radius of a circle expressed in km.
4108	2.3	Scale	Scale	ENUM	O	bib-1 101	The scaling used for the data (e.g. map).
4113	2.3	SensorId	Sensor/Instrument Identifier	ENUM	O	bib-1 101	A mnemonic or otherwise abbreviated version (acronym) for the sensor/instrument. In case that several sensors are carried on board of an instrument a separate SensorId is provided that is constructed by "<InstrumentId>-[<SensorId>}". Note that <InstrumentId> can appear without <SensorId> following it, but that <SensorId> must be preceded by <InstrumentId>. Moreover, a hyphen must be used as separator between <InstrumentId> and <SensorId>. If a search is desired on a sensor type, e.g., radiometer, a wild card search can be performed
4115	2.3	SpatialResolution	Spatial Resolution	ENUM	O	bib-1 101	The minimum distance between two adjacent geographic points.
4119	2.3	TemporalResolution	Temporal Resolution	STRING	X	bib-1 108	The temporal frequency of data sampled.
4121	2.1	Track	Track	INTEGER	X	bib-1 206	Track number.

A.1.2.2.2 Optional Product Compound Use Attributes

Table A-9: CIP Optional Product Compound Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4017	2.1	Circle	Circle	compound	X	CIP 10	Circle on the surface of the Earth.
4026	1.2	DataOriginator	Data Originator	compound	X	CIP 204	Information about the originator of the data.
3116	2.1	GPolygon	G Polygon	compound	X	bib-1 202	Coordinates defining the outline of the area covered by the data.
3117	2.1	GPolygonOuterGRing	G Polygon Outer G Ring	compound	X	bib-1 202	The closed non-intersecting boundary of the interior area of the data spatial coverage.
4039	2.1	InstrumentSensor	Sensor/Instrument	compound	X	CIP 204	Information related to the sensor/instrument such as name and sensor modes. The sensor/instrument is the hardware used to acquire the data.
4056	2.3	LocalSchemaElements	Local Schema Elements	compound	X	CIP 204	Contains the list of all the local schema elements defined for a product.
4061	2.4	OrderOptionsGroup	Order Options Group	compound	X	CIP 204	Identifies a single order option group, i.e. a set of order options (processing, scene selection, delivery) which can be freely combined between themselves.
4071	2.3	Platform	Platform	compound	X	CIP 204	Support which carries the instrument(s)/sensor(s). A platform can be a spacecraft, a ground station or an aircraft.
4072	2.1	Point	Point	compound	X	bib-1 201	Coordinates of a point on the surface of the Earth.
4073	2.1	Processing	Processing	compound	X	CIP 204	Information related to the processing of the data, such as the processing centre and the processing level.
4075	1.3	ProcessingLevel	Processing Level	compound	X	CIP 204	Processing level information.
4079	2.1	ProductDeliveryOption	Product Delivery Option	compound	X	CIP 204	Information about a delivery option available for a data product, such as formats, media.
4081	2.1	ProductOrderOptions	Product Order Options	compound	X	CIP 204	Information about the different processing and/or order options available for product order.
4084	2.1	ProductServiceOptions	Product Service Options	compound	X	CIP 204	The different service options available for a data product, such a different order options.
4091	1.2	QAProductStatistics	Quality Assurance Product Statistics	compound	X	CIP 204	Statistics for the quality assurance of products.

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4118	2.2	TemporalPeriod	Temporal Period	compound	X	CIP 210	Period definition for the data content.
4128	2.3	VerticalExtent	Vertical Extent	compound	X	CIP 204	Metadata for the vertical space covered by the item descriptor above and/or under the earth's surface.
4129	2.1	WRSGRSPass	WRS/GRS Pass	compound	X	CIP 9	World Reference System / Geolocation Reference System pass.
4130	2.1	WRSGRSScene	WRS/GRS Scene	compound	X	CIP 9	World Reference System / Geolocation Reference System scene.

A.1.3 User Use Attributes

A.1.3.1 Mandatory User Use Attributes

A.1.3.1.1 Mandatory User Leaf Use Attributes

The CIP does not contain any mandatory User descriptor leaf Use attribute.

A.1.3.1.2 Mandatory User Compound Use Attributes

The CIP does not contain any mandatory User descriptor compound Use attribute.

A.1.3.2 Optional User Use Attributes

A.1.3.2.1 Optional User Leaf Use Attributes

Table A-10: CIP Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
2023	1.2	PersonName	Person Name	STRING	X	bib-1 101	Name of a person. The last name should be given first, followed by the first name and, if applicable, the middle name.
4126	2.2	UserId	User Identifier	STRING	X	bib-1 101	Identifier of a user.

A.1.3.2.2 Optional User Compound Use Attributes

Table A-11: CIP Use Attributes

Id #	Ver.	Name	Short Meaning	Value Syntax	Valid Source	Str.	Meaning
4125	2.2	UserDescriptor	User Descriptor	compound	X	CIP 204	Information about a user.

A.2 Relation Attributes

The *Relation attributes* define the relation that must hold between the search *access point* (the *Use attribute*) and the *term* during the evaluation of an *operand*, for a *database record* to be selected in the *result set* of the *operand*.

Table A-12 contains the list of the *Relation attributes* supported by the CIP. The identifier of the *Relation attributes* represents the *attribute value* '#' for the *Relation attribute type* within the *Attribute set* identified by 'AS'. In this manner, the OID of the CIP *Relation attribute* values are defined as **`{Z39-50-AttributeSet-bib-1 2 #}`** for the *attributes* from the bib-1 *Attribute set* and as **`{Z39-50-CIP-AttributeSet 2 #}`** for the *attributes* from the CIP *Attribute set*.

Table A-12: CIP Relation Attributes

Id		Ver	Name	Meaning
AS	#			
bib-1	1	1.2	Less Than	The target value is less than the search term value.
bib-1	2	1.2	Less Than or Equal	The target value is less or equal to the search term value.
bib-1	3	1.2	Equal	The target value is equal to the search term value (subject to possible qualifications by the truncation or structure attributes).
bib-1	4	1.2	Greater Than or Equal	The target value is greater than or equal to the search term value.
bib-1	5	1.2	Greater Than	The target value is greater than the search term value.
bib-1	6	1.2	Not Equal	The target value is not equal to the search term value (subject to possible qualifications by the truncation or structure attributes).
bib-1	103	1.2	Always Matches	When the relation Always Matches occurs: • The target ignores the supplied term. • If the Use attribute is **Any**, then **all** records of the target database are selected. • If a Use attribute is other than **Any**, then **all** records are selected for which the access point corresponding to the supplied Use attribute is meaningful[3].
CIP	7	2.3	Overlaps	The intersection between the target spatial/temporal coverage and the spatial/temporal coverage defined by the search term is non-null (i.e. the target and search coverage have an area in common).
CIP	8	2.3	Fully Enclosed Within	The target spatial/temporal coverage is fully enclosed within the spatial/temporal coverage defined by the search term.
CIP	9	2.3	Encloses	The target spatial/temporal coverage fully encloses the spatial/temporal coverage defined by the search term.
CIP	10	2.3	Fully Outside Of	The intersection between the target spatial/temporal coverage and the spatial/temporal coverage defined by the search term is null (i.e. the target and search coverage have no area in common).
CIP	14	2.3	Before	The target date (or date range) is before the search term date (or date range).
CIP	15	2.3	Before or During	The target date (or date range) is before or during the search term date (or date range).
CIP	16	2.3	During	The target date (or date range) is during the search term date (or date range).

[3] For example, if the *RPNQuery* in a product *Search request* contains an *Operand* with an *AttributePlusTerm* including an *AttributeList* with the Use attribute *QAPercentCloudCover* and the *Relation attribute* Always Matches, the *Term* is ignored and all the product descriptors which **include** the QAPercentCloudCover *schema element* (which is not mandatory in the CIP product schema) are selected.

Id AS	Id #	Ver	Name	Meaning
CIP	17	2.3	During or After	The target date (or date range) is during or after the search term date (or date range).
CIP	18	2.3	After	The target date (or date range) is after the search term date (or date range).
CIP	19	2.4	Included In	The target item descriptor is included in the collection identified by the item descriptor identifier provided in the search term.
CIP	104	2.3	Never Matches	When the relation Never Matches occurs: • The target ignores the supplied term. • If the Use attribute is **Any**, then **no** records of the target database are selected. • If a Use attribute is other than **Any**, then all records are selected for which the access point corresponding to the supplied Use attribute is **not** meaningful[4].

The coverage relations are illustrated in Figure A-1 (spatial coverage relations) and Figure A-2 (temporal coverage relations):

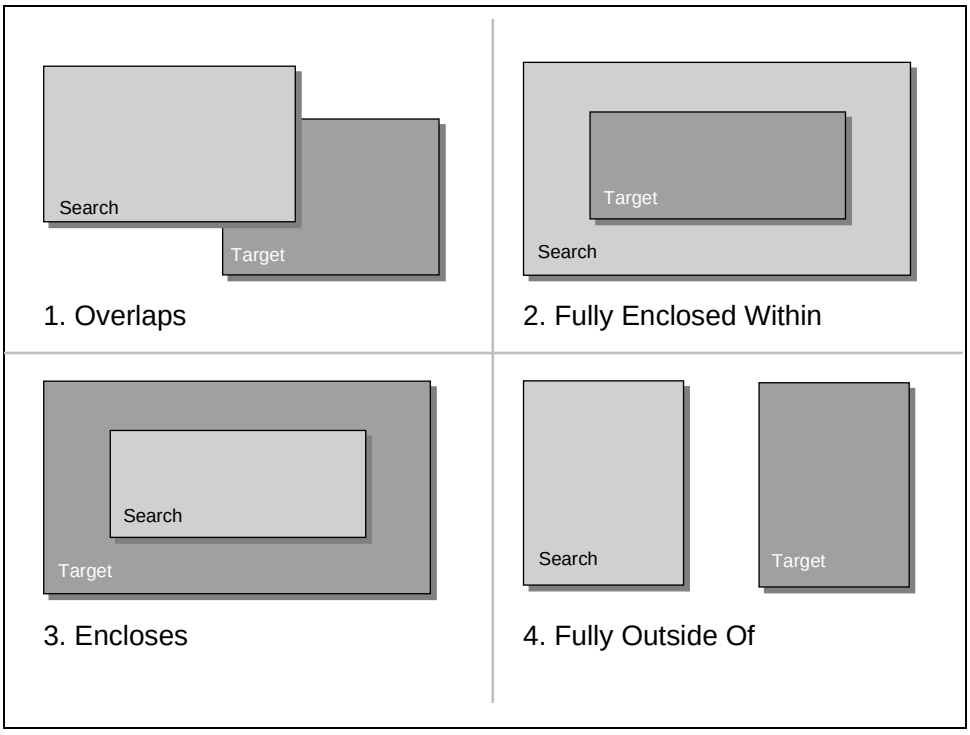

Figure A-1: Spatial Relationships

[4] For example, if the *RPNQuery* in a product *Search request* contains an *Operand* with an *AttributePlusTerm* including an *AttributeList* with the Use attribute *QAPercentCloudCover* and the *Relation attribute* Never Matches, the *Term* is ignored and all the product descriptors which **do not include** the QAPercentCloudCover *schema element* (which is not mandatory in the CIP product schema) are selected.

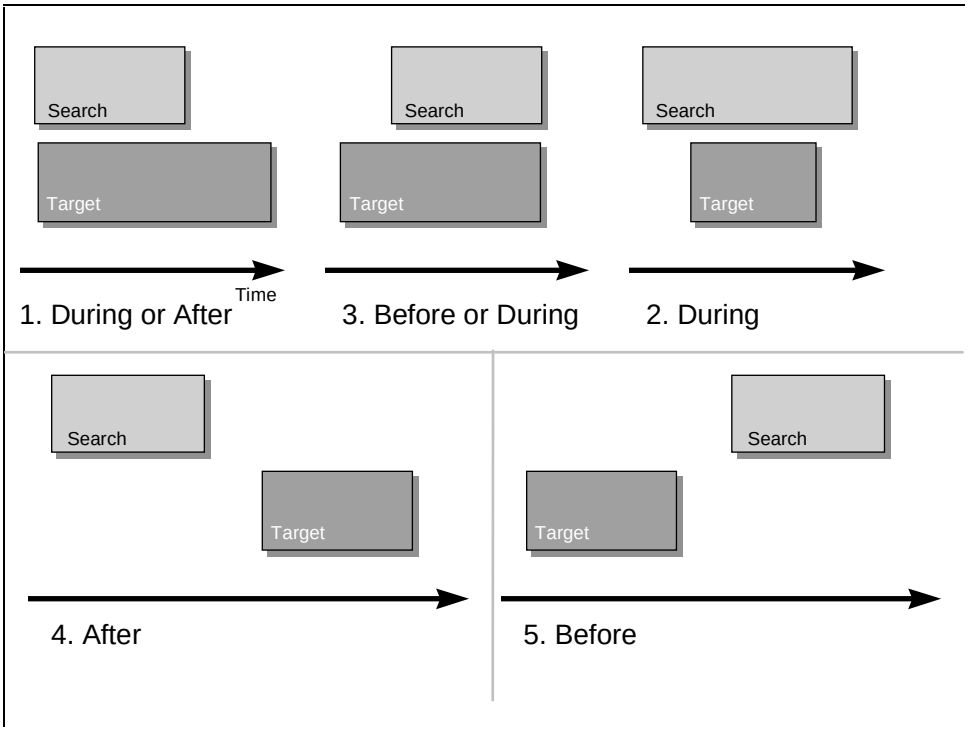

Figure A-2: Temporal Relationships

A.3 Position Attributes

The *Position attributes*[5] define the position that the *term* must hold within the *Use attribute* instance during the evaluation of an *operand* for a *database record* to be selected in the result set of the operand.

Table A-13 contains the list of the *Position attributes* supported by the CIP The identifier of the *Position attributes* represents the *attribute value* '#' for the *Position attribute type* within the *Attribute set* identified by 'AS'. In this manner, the OID of the CIP *Position attribute* values are defined as **`{Z39-50-AttributeSet-bib-1 3 #}`** for the *attributes* from the bib-1 *Attribute set*.

Table A-13: CIP Position Attributes

Id		Ver	Name	Meaning
AS#	**#**			
bib-1	1	1.2	First in field	The search term must be the first data in the field.
bib-1	2	1.2	First in sub-field	The search term may appear in any sub-field but must be the first data in the sub-field in which it appears.
bib-1	3	1.2	Any position in field	The search term may appear any place in the field.

5 *Position attributes* are most useful when searching textual data (e.g. an abstract), where, for example, each 'field' referred to means a word within a string.

A.4 Structure Attributes

The *Structure attributes* define the form in which the search *term* is supplied in the search query (see Section 3.5.2.1).

Table A-14 contains the list of the *Structure attributes* supported by the CIP. The identifier of the *Structure attributes* represents the *attribute* value '#' for the *Structure attribute* type within the *Attribute set* identified by 'AS'. In this manner, the OID of the CIP *Structure attribute* values are defined as **`{Z39-50-AttributeSet-bib-1 4 #}`** for the *attributes* from the bib-1 *Attribute set* and as **`{Z39-50-CIP-AttributeSet 4 #}`** for the *attributes* from the CIP *Attribute set*.

The '**ASN.1 Type**' column in the table indicates the choice to be selected for the search *term*.

Table A-14: CIP Structure Attributes

Id		Ver	Name	ASN.1 Type	Meaning
AS	#				
bib-1	1	1.2	Phrase	InternationalString	A phrase consists of one or more groups of characters separated by blanks (ASCII hex '20'). The value to be searched is exactly as it appears in the search term with respect to order and adjacency. Word(s) in the phrase may be explicitly truncated (see Truncation Attribute). To indicate that additional words may appear in the access point, use the Completeness Attribute.
bib-1	2	1.2	Word	InternationalString	A word consists of a group of non-blank characters. It specifies the exact text of the value to be searched, unless the word is explicitly truncated (see Truncation Attribute). A word search term contains no blanks.
bib-1	3	1.2	Key[6]	InternationalString	A key specifies a sequence of characters extracted from those characters contained in an indexed word but not necessarily representing complete words. In the term, key segments should be separated by a blank.
bib-1	4	2.3	Year	InternationalString	The year when an event takes place. The year is formatted according to the ISO/8601 Date/Time standard following the ASCII presentation defined in [TIME].
bib-1	6	1.2	Word list	InternationalString	A Word List consists of one or more words separated by blanks (ASCII hex '20'). No order of the words is implied. The attributes (other than structure) that are associated with the search term apply to each word in the word list. Any words in a word list may be explicitly truncated (see Truncation Attribute). The relationship between the words in a word list is target-specific.
bib-1	100	2.4	Date (un-normalised)	InternationalString	The year, month and day when an event takes place. The date is formatted according to the ISO/8601 Date/Time standard following the ASCII presentation defined in [TIME].
bib-1	101	1.2	Name (normalised)	InternationalString	A name search term that is structured in a particular order (e.g. last name followed by first name). The resulting term is subject to special matching rules on the target system that differ from those applied to names structured as phrases or unstructured names.
bib-1	102	1.2	Name (un-normalised)	InternationalString	A name search term that is unstructured, however, the resulting term is subject to matching rules on the target system that differ from those applied to phrases or structured names (e.g. the term 'john smith' might be searched by the target as 'smith, j#').

6 The 'Key' *Structure attribute* is not supported by the CIP for searches of CIP data. However, it is included here as its use is recommended in [Z3950] in order to support the use of the *Explain facility*.

Id		Ver	Name	ASN.1 Type	Meaning
AS	#				
bib-1	103	1.2	Structure	N/A	The term has a structure that is either implied by the Use attribute or defined by the target.
bib-1	104	1.2	URx	InternationalString	The term is a document identifier, for example, an identifier extracted from a Z39.50 URL.
bib-1	105	1.2	Free-form text	InternationalString	The term is text, input by the end user.
Bib-1	108	1.2	String	InternationalString	The entire term is to be treated as a string, rather than a sequence or set of individual words.
Bib-1	109	1.2	Numeric string	InternationalString	The term is a character string that represents a number (real or integer).
CIP	100	1.2	Time	InternationalString	The time at which an event takes place. The time is formatted according to the ISO/8601 Date/Time standard following the ASCII presentation defined in [TIME].
CIP	200	2.3	Coordinate	InternationalString	The term is a coordinate. The coordinate is formatted according to WGS84, i.e. a coordinate is in decimal degrees and is represented as a string.
CIP	201	2.3	Point	InternationalString	The term is a point. A point is an ordered pair of coordinates, i.e. a x (longitude) and y (latitude) pair. The longitude and latitude are separated with a space or comma delimiter.
CIP	202	2.3	Bounding Polygon	InternationalString	The term is a bounding polygon. A bounding polygon is an ordered list of Coordinates as x (longitude) and y (latitude pairs expressed with a space or comma delimiter between the x and y and a space between the pairs, as so: x,y x,y x,y etc. (e.g. 102.32,45.003 " " -103.45,46.007 " " 103.79,46.141 etc.). If a bounding polygon is used to define an enclosing region, the terminal pair shall be encoded with the same values as the initial pair to define full enclosure. A bounding polygon with only two pairs entered shall represent a bounding rectangle where the north-west and south-east corners of a described area are provided, using a system orthogonal to the axes of latitude and longitude.
CIP	204	2.3	Composite	EXTERNAL	The term is a compound element which must be defined externally. The exact external compound is implied by the Use attribute.
CIP	205	2.3	Real	InternationalString	The term is a REAL number.
CIP	206	2.3	Integer	INTEGER	The term is an INTEGER number.
CIP	210	2.4	DateRangeString	InternationalString	The recurring time interval when an event takes place. The date is formatted according to the ISO/8601 Date/Time standard following the ASCII presentation defined in [TIME].
CIP	9	2.1	WRS/GRS Spatial Coverage	EXTERNAL	The term is a WRS/GRS scene or pass. The structure of the 'WRS/GRS Coverage' is defined externally (see Appendix E).
CIP	10	2.1	Circle	EXTERNAL	The term is a circle. The structure of the 'Circle' is defined externally (see Appendix E).

A.5 Truncation Attributes

The *Truncation attribute* specifies whether one or more characters may be omitted in matching the search *term* in the target system at the position specified by the *Truncation attribute*. For example, a word in a search *term* may be:

- right truncated, in which case the word is treated both as a complete word and as the beginning of a longer word;
- left truncated, in which case the word is treated both as a complete word and the ending of a longer word;
- left and right truncated, in which case the word is treated as a complete word and the beginning or ending of a longer word;
- embedded truncation, in which case the word is treated as a complete word and as a longer word with additional characters at the point where the truncation symbol '#' appears in the search term.

For right truncation, left truncation, and left and right truncation, the characters affected by the truncation are determined by the value of the *Structure attribute*.

Table A-15 defines the list of the CIP *Truncation attributes*. The identifier of the *Truncation attributes* represents the attribute value '#' for the *Truncation attribute* type within the *Attribute set* identified by 'AS'. In this manner, the OID of the CIP *Truncation attribute* values are defined as **`{Z39-50-AttributeSet-bib-1 5 #}`** for the *attributes* from the bib-1 *Attribute set*.

Table A-15: CIP Truncation Attributes

Id		Ver	Name	Meaning
AS	**#**			
bib-1	1	1.2	Right truncation	The term is right-truncated depending on its structure in the following manner: • word/phrase: last word of term is right truncated • string: entire term is right truncated • word list: each word is right truncated.
bib-1	2	1.2	Left truncation	The term is left-truncated depending on its structure in the following manner: • word/phrase: first word of term is left truncated • string: entire term is left truncated • word list: each word is left truncated.
bib-1	3	1.2	Left and right	The term is left and right truncated depending on its structure in the following manner: • word/phrase: first word of term is left truncated and last word of term is right truncated. • string: entire term is left and right truncated • word list: each word is left and right truncated.
bib-1	100	1.2	Do not truncate	No truncation is to be applied.
bib-1	101	1.2	Process # in search term	The search term contains the symbol '#' to show where truncation will take place.

A.6 Completeness Attributes

The *Completeness attribute* specifies that the contents of the search *term* represent a complete or incomplete sub-field or a complete field. *Completeness* indicates whether additional words should appear in a field or sub-field with the search *term*.

Table A-16 defines the list of the CIP *Completeness attributes*. The identifier of the *Completeness attributes* represents the *attribute* value '#' for the *Completeness attribute type* within the *Attribute set* identified by 'AS'. In this manner, the OID of the CIP *Completeness attribute values* are defined as **`{Z39-50-AttributeSet-bib-1 6 #}`** for the *attributes* from the bib-1 *Attribute set*.

Table A-16: CIP Completeness Attributes

Id		Ver	Name	Meaning
AS#	#			
bib-1	1	1.2	Incomplete sub-field	Words other than those in the search term may appear in the sub-field or field in which the term appears.
bib-1	2	1.2	Complete sub-field	No words other that those in the search term should appear in the entire sub-field in which the term appears, but additional words may appear in other sub-fields in the field.
bib-1	3	1.2	Complete field	No words other than those in the search term should appear in the entire field in which the term appears.

A.7 CIP Attributes Combinations

This appendix defines the *attribute combinations* that are supported by the CIP profile. It contains the following subsections:

- Appendix A.7.1 defines the underlying principles and the guidelines that must be followed in combining *attributes*.
- Appendix A.7.2 defines the CIP permissible *attribute combinations*.
- Appendix A.7.3 defines the CIP mandatory *attribute combinations*.
- Appendix A.7.4 illustrates the definition of the CIP permissible *attribute combinations* by providing examples.

A.7.1 CIP Attribute List Principles and Guidelines

The *attribute list* in an RPN query must be defined according to the following principles:

- No duplicates are allowed in an *attribute list* (a given *attribute* may appear at most once in an *attribute list*).
- *Attributes* are sorted in the *attribute list* in the increasing order of their *attribute type* (i.e. in the order *Use*, *Relation*, *Position*, *Structure*, *Truncation* and *Completeness*).
- Except for the *Use attribute type*, at most one *attribute* of a given *attribute type* may be included in an *attribute list*.
- An *attribute list* must contain at least one *Use attribute*.
- An *attribute list* may contain more than one *Use attribute*. In this case, the *Use attributes* in the list must refer to the same compound and must be sorted from general to particular. In other words, the list of *Use attributes* must match to a *schema element* and be sorted in the order corresponding to the *tag path* in the *schema* definition.
- An *attribute list* used in a RPN query aimed to be interoperable with another Z39.50 profile (e.g. GEO[GEO]) must contain one and only one *Use attribute*.

- If a *Structure attribute* is not specified in an *attribute list*, the recommended *Structure* for the most specific *Use attribute* defined in the *attribute list* (i.e. the *element* in a compound *schema element* which is at the lowest hierarchical level) may be assumed to be as specified in the tables in Section A.1.

Moreover, the following guidelines should be followed for the combination of *Use attributes*:

- The canonical form for the specification of the target *term* to be matched is the list of *Use attributes* corresponding to the full specification of the *tag path* of the *target schema element*.
- As it is always clear from the query whether a search is targeted at a collection or a product, the first *Use attribute* in the list (corresponding to first *tag* in the *tag path* of the *schema element* and specifying whether the *schema element* refers to a collection or a product), may be omitted.
- If a list of *Use attributes* shorter than the canonical form (that we shall call 'short form') allows to unambiguously identify a *schema element*, this list of *attributes* may be used instead of the canonical form.
- When a sub-component is used in more than one compounds (e.g. 'Abstract' is used in several compounds), this sub-component may be used in the two following ways:
  - If a search is directed uniquely to a specific compound, the list of *Use attributes* must correspond to the *tag path* of the compound.
  - If a search is directed to the sub-component (independently of the compound in which it appears), the list of *Use attributes* will omit the *tag* of the compound element.

Note that short forms may enormously simplify the specification of queries (by dramatically reducing the number of *attributes* required to represent a search criterion). However, the short form is exposed to breakage in further releases (the addition of new compounds may introduce ambiguities in the interpretation of short form queries), whereas the canonical forms are unlikely to be affected by changes in the *database schema*.

A.7.2 CIP Permissible Attribute Combinations

Table A-17 defines the list of the CIP permissible *attribute combinations* by showing how the various *attribute types* (identified by their name and number) can be combined together. For each *Structure attribute*, identified by its originating *Attribute set* ('AS') and its attribute number ('#'), the status of the combination with other types of *attributes* is identified. For the *Relation attribute* type, this is further refined to each single *attribute value* within the type. 'O' identifies a valid combination, while 'X' identifies an invalid combination. A blank cell indicates that the status of the combination is not defined by this profile and is to be determined by the *target*.

By combining the recommended *Structure attribute* defined for each *Use attribute* in the 'Str' column in the tables in Section A.1 with the permissible *attributes* defined for each *Structure attribute* in Table A-17, it is possible to determine the permissible *attribute combinations* for each Use Attribute. Note however that in this way the validity of a combination may be determined for a *Use attribute* even if another *Structure attribute* is used than the recommended one (for instance, a use *attribute* which is usually handled as a 'word' may be, in particular cases, be handled as a 'string').

Table A-17: Permissible Attribute Combinations

Structure (4) AS	#	Name	**Relation (2)** Less Than (1)	Less Than or Equal (2)	Equal (3)	Greater Than or Equal (4)	Greater Than (5)	Not Equal (6)	Over-laps (7)	Fully Enclosed Within (8)	Encloses (9)	Fully Outside Of (10)	Before (14)	Before or During (15)	During (16)	During or After (17)	After (18)	Included In (19)	Always Matches (103)	Never Matches (104)	**Pos** (3)	**Trunc** (5)	**Comp** (6)
bib-1	1	Phrase	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	O	O	O
bib-1	2	Word	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	O	O	O
bib-1	3	Key[6]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
bib-1	4	Year	O	O	O	O	O	O	X	X	X	X	O	O	O	O	O	X	O	O	X	X	X
bib-1	6	Word list	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	O	O	O
bib-1	100	Date (unnormalised)	O	O	O	O	O	O	X	X	X	X	O	O	O	O	O	X	O	O	X	X	X
bib-1	101	Name (normalised)	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	O[7]	O	O	X	X	X

[7] The 'Included In'*Relation attribute* may be used if and only if the most specific *Use attribute* in the *Use attribute list* is 'ItemDescriptorId'.

Structure (4) AS	#	Name	Relation (2) Less Than	Less Than or Equal	Equal	Greater Than or Equal	Greater Than	Not Equal	Over-laps	Fully Enclosed Within	Encloses	Fully Outside Of	Before	Before or During	During	During or After	After	Included In	Always Matches	Never Matches	Pos	Trunc	Comp
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(14)	(15)	(16)	(17)	(18)	(19)	(103)	(104)	(3)	(5)	(6)
bib-1	102	Name (unnormalised)	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
bib-1	103	Structure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
bib-1	104	URx	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
bib-1	105	Free-form text	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
bib-1	108	String	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	O	O	O
bib-1	109	Numeric String	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
CIP	100	Time	O	O	O	O	O	O	X	X	X	X	O	O	O	O	O	X	O	O	X	X	X
CIP	200	Coordinate	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
CIP	201	Point	X	X	O	X	X	O	X	X	O	O	X	X	X	X	X	X	O	O	X	X	X
CIP	202	Bounding Polygon	X	X	X	X	X	X	O	O	O	O	X	X	X	X	X	X	O	O	X	X	X
CIP	204	Composite	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
CIP	205	Real	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
CIP	206	Integer	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
CIP	9	WRS Spatial Coverage	X	X	X	X	X	X	O	O	O	O	X	X	X	X	X	X	O	O	X	X	X
CIP	10	Circle	X	X	X	X	X	X	O	O	O	O	X	X	X	X	X	X	O	O	X	X	X
CIP	11	Temporal Period	X	X	X	X	X	X	O	O	O	O	X	X	X	X	X	X	O	O	X	X	X

A.7.3 CIP Mandatory Attribute Combinations

This section defines the attribute combinations that are mandatory for CIP compliance.

An attribute combinations which fulfils the following conditions:

- the attribute list in the attribute combination follows the CIP attribute list principles and guidelines as defined in Section A.7.1.
- the attributes in the attribute list form a CIP permissible attribute combination as defined in Section A.7.2.
- all the use attributes in the attribute combination are flagged as mandatory use attributes in Section A.1.

is defined as a mandatory CIP attribute combination.

A.7.4 Attribute Combinations Examples

Table A-18 illustrates the use of permissible *attribute combinations* by providing examples of valid *attribute lists*:

Table A-18: Permissible Attribute Combinations Examples

#	Type	Canonical Form						Short Form	Meaning
		Use	Rel.	Pos.	Struct.	Trunc.	Comp.	Use	
1	Coll	4019, 4	bib-1 3		bib-1 101			4	The ItemDescriptorName (i.e. the collection name) of the Collection is Equal to the Term.
2	Coll	4019, 4078, 2062, 2072	bib-1 5		bib-1 100			2072	The Start date of the TemporalCoverage of the Collection is Greater Than the Term.
3	Coll	4019, 3121, 3122, 2002	bib-1 3		bib-1 6			2002	The ThemeKeyword of a Collection is Equal to the Term.
4	Coll	4019, 3000, 2023	bib-1 3		bib-1 101	bib-1 1		2023	The first characters of the PersonName of a Contact for a Collection are Equal to (match) the first characters of the Term (the Term is Right Truncated).
5	Prod	4080, 2059, 2060	CIP 8		CIP 202			2060	The spatial region of a Product is Fully Enclosed Within the spatial region defined by the BoundingRectangle defined by the Term.
6	Prod	4080, 2059, 2060, 2040	bib-1 4		CIP 200			2040	The latitude of the North-most point of a Product is Greater than the North-most point defined by the Term.